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COAL MINING

February, 1960 Volume 37, No. 2

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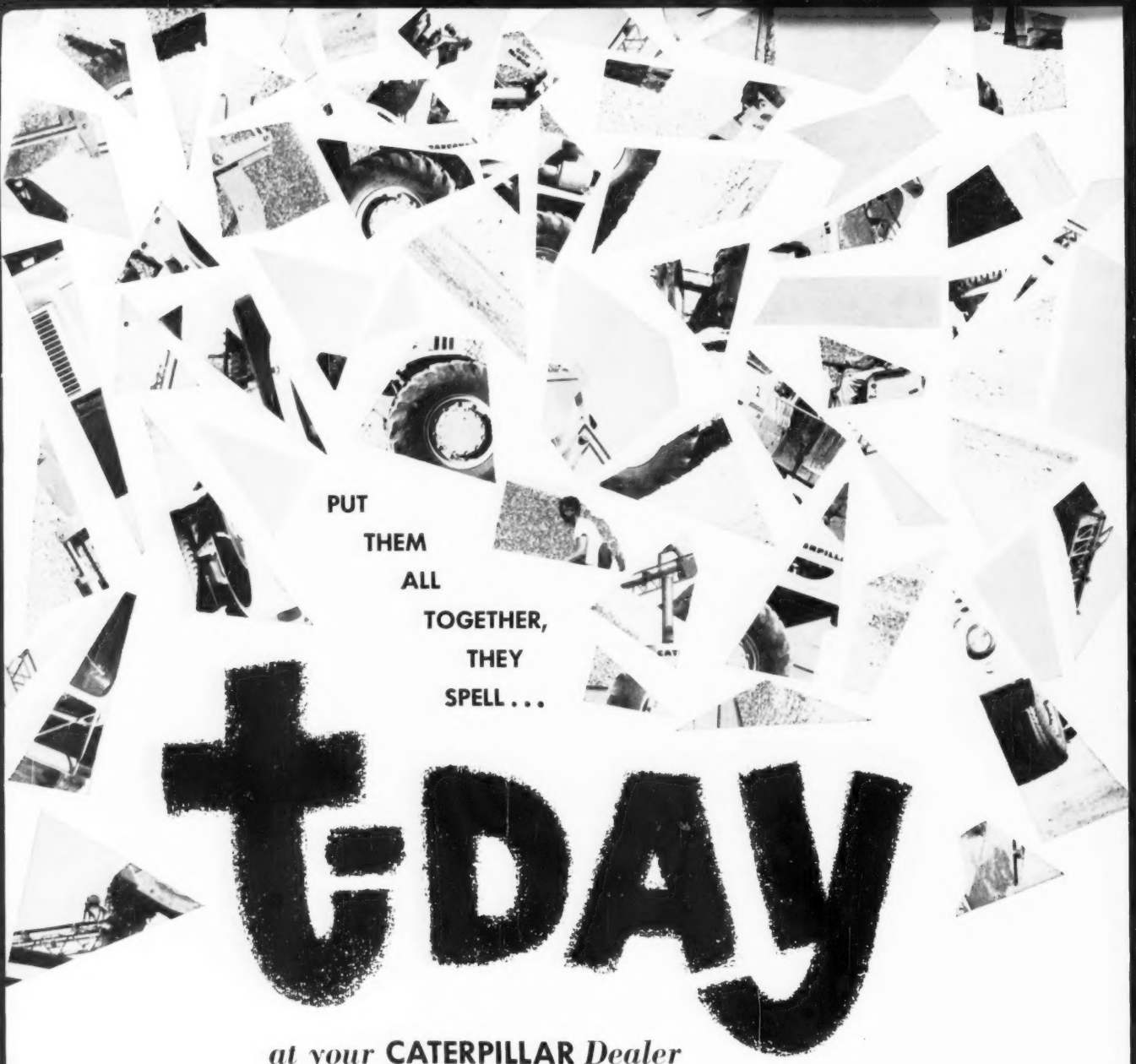

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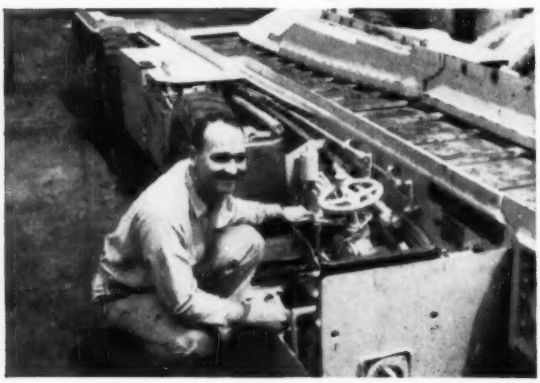

Jeffrey field service engineer, W. C. Mayo, is one of our factory trained field service group constantly providing on-the-spot technical assistance. Here Mr. Mayo is checking adjustments on a shuttle car at mine portal preparatory to start on production.

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COAL MINING

Vol. XXXVII February, 1960 No. 2

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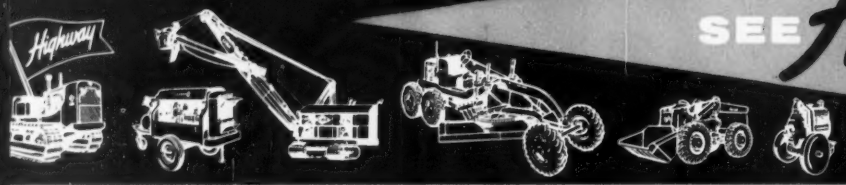

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Do You Know?

● Whether industry should abandon the inch and adopt the centimeter in industry is being debated. It is being urged that the other units of the metric system widely used abroad and in research laboratories in this country should be used more universally.

Already legal and the prime standard of measurements, the metric system is still not generally used.

Discussions at the American Association for the Advancement of Science showed that some large industries, notably in pharmaceuticals and astronautics favor converting to the metric system. Other areas, notably steel fabricating, automobile manufacturing and gauge manufacturing are opposed.

Vice Admiral G. F. Hussey, Jr., managing director, American Standards Association, New York, reported that the discussion tended to support opposition to the conversion.

Most industries that favor the metric system, like pharmaceutical manufacturers, are closely allied to research methods. For instance, Parke, Davis and Company, Detroit, has converted to the Metric system with standardization of all weighing and measuring equipment, reduced chances of error, less maintenance, simpler inventory and full use of electronic data processing.

On the other hand, metal industries, auto makers and similar firms cite in opposing the metric system the cost of the physical changes in drawings and equipment that would be necessary and the loss of skills on the part of designers and workmen accustomed to visualizing in inch dimensions.

DECIMAL FRACTIONS FAVORED FOR CANS

Expression of fractions of pounds, pints, etc., in decimals, not in ounces, etc., was favored by Dr. Colston E. Warne, professor of economics, Amherst College, and president, Consumers Union of U. S. Where 3 lb. 2½ oz. now appears on a "giant size" detergent package, it would read 3.16 lb. This would make it easier for a customer to do his arithmetic in choosing the best buys.

The eventual goal in Dr. Warne's opinion would be a switch to the metric system of units, but a step in that direction would be to do what one brand of baby food does, when its label states both kinds of units: 3½ oz., 99 grams.

Dr. Warne suggested that some manufacturers may produce varied and peculiar weights of packages merely to confuse the buyers. On one grocery shelf seven weight packages, ranging from 2 lb. 5½ oz. to 3 lb. 8½ oz. were found all labeled "giant size."

HERE AND THERE IN THE COAL INDUSTRY

R. L. McCHAIN — Le Roi Division

● A sales department reorganization was announced by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. Emphasis will be placed on selling by markets rather than by product lines.

Headed by R. L. McChain as manager, construction and mining industry sales, will concentrate on the construction, mining and quarry industries. Working with him as assistant managers will be C. L. Meigs and N. W. Reinker.

A specialist in the portable air compressor line, manufactured in Milwaukee, Meigs has been with Le Roi for 15 years. Reinker has worked in sales for over 25 years at Le Roi's plant in Cleveland, Ohio. The plant produces air tools for the mining and construction industries.

● The average American worker statistically safer on the job than at home or on the roads, will enjoy an added margin of safety as the result of the recent revisions to the American Standard covering safety glasses, respirators, and hard hats. The newly revised American Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1-1959, is available from the American Standards Association.

The purpose of the 46-page standard is "to provide reasonable and adequate means, ways, and methods for the proper selection and safe use of head, face, neck, eye, and respiratory protective equipment." It applies to all operations or processes except those relating to communicable air-borne diseases or x-rays, gamma rays, and high-energy particulate radiations such as alpha, beta, or neutron rays.

Changes made since the previous 1938 edition include the addition of plastic eye protectors, and an increase in strength requirements for eye protection. One section contains 86 definitions of words common to this field. In general, the code has been brought up to date with modern production methods working environments and available safety equipment.

The code is sponsored under ASA procedures by the Department of the Navy, the National Bureau of Standards, and the U. S. Bureau of Mines. A total of 33 national groups are members of the ASA sectional committee which prepared the latest revision.

The American Standards Association is the clearinghouse and coordinating body for voluntary national standards. It is a federation of 120 trade associations, technical societies, and consumer groups, with more than 2,000 company members.

American Standard Safety Code for Head, Eye, and Respiratory Protection, Z2-1-1959, 48 pp., is available at $3.00 a copy from the American Standards Association, Dept. PR121, 70 East 45th Street, New York 17, New York.

Summary Of Technical Coal Mining Papers Read At The ALME Meeting In New York City, February 15, 16 and 17

● Gratifying experience in underground coal mining has demonstrated that continuous mining programs can be successful, John A. Stachura, Vice President of Enoco Colleries, Inc., Bruceville, Indiana, assured the Coal Division.

"From 1948 to 1955, approximately 450 continuous mining machines were in service. In October, 1959, there were more than 700. 1958, more than 56 million tons of coal were produced by continuous mining machines. This was approximately 20 percent of the total produced by deep mining. Pennsylvania was in the lead with 46 percent of its total underground tonnage produced by continuous miners: Illinois had 25 percent and West Virginia 18 percent. This total was produced at 213 mines, with 45 of these mines using continuous miners exclusively."

* * *

In the use of continuous miners, maintenance no longer is a stepchild of the coal industry but is on an equal level with production, Joseph Mason, of Fairmont, West Virginia, Maintenance Engineer of the Mountaineer Coal Company, emphasized in a paper before the Coal Division.

"The primary objective in a continuous miner maintenance program is to get maximum yield through maximum running time. The miner although complex, is well built and is a reliable producer when given the proper care. Undoubtedly, one of the weakest links in production of coal from continuous miners is machine maintenance. Concentration of production into a single machine amplifies the effect of unit outage.

"The cost of a continuous miner makes it impractical to keep spare miners on hand to substitute for one that is down. Success or failure in maintenance will be a measure of success or failure of the operation. The time has come when maintenance is no longer something of a stepchild of the industry. It must be put in its rightful place where it belongs, on an equal level with production. Unless we are prepared to recognize the problems of maintenance, the continuous mining machine will fail to accomplish its purpose."

Mr. Mason said that 75 percent of the company's output comes from continuous miners and that the company's maintenance program has helped reduce costs of operations.

* * *

William Poundstone, of Osage, West Virginia, Superintendent of Humphrey Mine, Christopher Coal Company, reported on "Face Ventilation in Development with Continuous Miners." David C. Ridenour, of Coalwood, West Virginia, General Superintendent, Olga Coal Company, reported on the "Ventilation of Very Gassy Mines Making Use of Large Diameter Bore Holes."

Mr. Poundstone described face ventilation in development work as possibly the fastest growing problem of the industry. "Coal mines of the future will be faced with the prospect of mining from under increasing depths of cover," he said. Consequently, we can expect to find larger and larger amounts of methane gas. The Pittsburgh Seam in Northern West Virginia is an example of an area already faced with this problem. At present, most of the development work being done in this seam is beneath 500 to 1,200 feet of cover. The Pittsburgh Seam in this area always has been very gassy—even near the outcrop. Recent development work has been accompanied with extremely large volumes of gas."

"With all the mining or advancement concentrated in one place, ventilation also can be concentrated," said Mr. Poundstone. Continuous mining permits the active working place to be ventilated with a maximum amount of fresh air — taken directly from the intake source. Continuous mining with a good ventilating system, promotes safety by permitting much greater concentration of attention and vigilance on the actual working place, he said.

Mr. Poundstone ventured the belief that "with adequate volumes of air available, the ability to concentrate ventilation more than offsets the concentration of gas emission inherent with continuous mining." His paper went on to say:

Basically, the overall plan of mining is to advance headings into virgin coal and encircle large areas. These blocks are generally at least 2,000 feet square. With an opening competely around the block, gas is bled from the area before pillaring is begun. Experience has shown this method to be quite effective, even in the most gassy areas.

Mr. Ridenour, in his paper, stated that "the pressure system of ventilation with large diameter bore holes has been very effective in the ventilation of two gaseous mines, the Olga No. 1 and No. 2 in McDowell County."

Mr. Ridenour said that the system has made it possible to mine narrow areas of coal in both operations. He outlined advantages of the pressure system as follows:

"Dust-laden air from an underground dumping station can be directed up the hoist shaft and out of the mine without additional equipment. Hoisting shafts are not intake shafts and, as a result, freezing in the winter is no problem. In outcrop mines, any holes to the surface, whether planned or unplanned, will act as exhaust openings for the ventilation system, thus eliminating long return air circuits.

"Accumulation of methane in gob areas can be effectively prevented by the addition of bore holes to the ventilating system.

"Large diameter bore holes, stategically located, can act as return

shafts and reduce the traveling distance entries or reducing the water gauge or both."

Though it is common to provide safe ventilation of a coal mine by forced ventilation, long experience in an extremely gaseous seam has led the Island Creek Coal Company, at Holden, West Virginia, to prefer an exhaust system; that is, to reduce the inside mine pressure to less than atmospheric pressure by means of a mechanically operated fan. The system used there in efficient pillar extraction was described by Lonnie D. Ellison, Chief Mining Engineer.

"Undoubtedly, some will disagree with the ventilation system at this mine," said Mr. Ellison, "However, it works and the company recognizes the necessity of providing the facilities to maintain what is known as one of the safest, most efficient, best ventilated coal mines in the industry."

* * *

Results achieved by the equipment used in the mechanized tamping of mine haulage roads have been gratifying and have fulfilled expectations, D. H. Davis, Assistant to Vice President-Operations, Consolidation Coal Company, Pittsburgh, reported of the work of the machine at the Mathies Mine.

"The machine may be used on new track where hydraulic track leveling jack and rail clamps are extremely useful in bringing the new rail to the proper elevation or it may be used as a spot tamper," said Mr. Davis. "Great usefulness will be derived from this machine in reconditioning of roadbed and track that have been in service a number of years. Low spots or swags can be raised readily to proper elevation by disturbing new slag between the rails and on top of the ties. Then, by using the rail clamps, the rail and ties can be raised to the desired elevation and immediately tamped."

Mr. Davis pointed out: "Underground construction work of all types has been performed too often by inefficient manual methods and too little attention has been focused on the improvement of track laying procedures, the handling of bulk material, and better and more efficient methods for completing various types of mine construction."

* * *

Rope belt conveyors have helped reduce production costs at Massey Coal Mining Company, Omar, West Virginia, E. Morgan Massey, President of the company, stated today in a national convention paper before the American Institute of Mining, Metallurgical, and Petroleum Engineers.

The low, first cost and other advantages that have made the rope side frame construction so popular for underground use have proved to be even more applicable for cross-country transportation. Not only have they greatly simplified and reduced the overall costs of the complete handling system, but also allowed the selection of ideal sites for the location of the various elements of the coal preparation system including the coal storage facilities.

With the rapid development and acceptance of very high capacity coal extraction equipment, the cost of transporting coal from the mining face through the cleaning process and into the railroad car remains as probably the biggest item of cost of modern mining. Savings through the use of rope belt conveyors can contribute greatly to the overall lowered costs of production.

* * *

Though it is doubtful that any one method can solve all problems, results have been promising in the application of underground instrumentation techniques to strata control, Robert Stefanko, Instructor in Mining Engineering at the Pennsylvania State University, stated today in a paper at the national convention of the American Institute of Mining, Metallurgical and Petroleum Engineers.

"Although the bulk of the research has been done abroad, conditions favoring basic research in this area are becoming more prevalent in the American mining industry. Decreased recovery rates at increased depths, greater incidence of rock bursts and coal bumps, and a general deterioration of natural support conditions are to be expected. Through underground instrumentation there will be a better understanding of the effect of the various parameters on the stress distribution around mine openings. This will contribute greatly to the ever present objective of mining: an increased productivity rate with decreased cost, consistent with safety."

* * *

The major importance of a foremen's incentive plan in an industrial engineering program is fully recognized at the Mountaineer Coal Company, Fairmont, West Virginia, it was established in a convention paper by Arthur E. Belton, Planning Engineer.

"For years, top management in manufacturing and sales has recognized the importance of standards and incentive pay for management in the front line. Because of the inherent nature of mining, the foreman exercise more direct and effective control over cost than anyone in management. It is the foreman who is in direct control of the men, machines and materials. If a company is to be leader in its field in the face of strong competition, all three of these resources must be used efficiently. Therefore, the most effective control is that exercised at the working level.

"A good industrial engineering program with a foremen's incentive plan is not the result of main office far-fetched ideas, fancy charts, forms or formulas. It cannot be ordered into existence as a repair part. The whole system must have adequate meaning and an objective for the people who must work with it. The local mine management must be sold on the entire program if it is to prove successful. Therefore, it is imperative that the industrial engineer work very closely with the local mine management.

"Since no capital investment is required for an industrial engineering program, the potential savings can be a strong inducement for the mining industry to use this tool. A foremen's incentive plan is actually a tool to assist top management to perform its job with a high degree of efficiency.

Why Crankshafts Fail

By W. E. IRWIN
Manager, Service Department
Caterpillar Tractor Co., Industrial Engine Plant, Peoria, Illinois

● When a major mechanical failure occurs to an engine, it is a natural reaction for the owner to blame the manufacturer. Company representatives, investigating such failures, are often met with such remarks as, "Your engine broke a crankshaft and ruined our torque converter," or "Your engine has failed and we expect you to give us a new engine, or at least a new crankshaft and cylinder block."

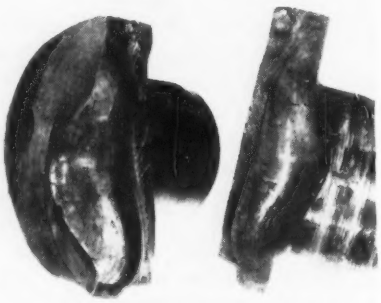
Although engine builders often recompense owners for engine damage resulting from crankshafts and other engine components that fail because of "defects in materials or workmanship," facts accumulated over the years prove that the odds are heavily in favor of crankshaft failures being caused by some external force or condition.

No matter who builds the engine, crankshafts and bearings are not designed to withstand the extreme stresses that can be exerted on them when various types of power take-offs are misaligned, improperly positioned endwise or so designed that they can exert abnormal forces on the crankshaft.

Recently a relatively new engine on a drilling rig experienced a severe seizure of the rear main bearing which ruined the crankshaft, as well as the cylinder block, causing damage amounting to nearly $10,000. The engine was driving directly into an air clutch and an on-the-job check revealed the inner drum of the clutch was extremely misaligned in relation to the outer drive ring. The extreme side loads exerted on this engine's flywheel and crankshaft caused the rear main bearing to seize the full length of its bore, generating so much heat that both the crankshaft forging and cylinder block casting cracked beyond repair.

Alignment of air clutches is critical. The higher the air pressure in the boot, the closer the alignment must be to keep the side loads within safe limits. Misaligned air clutches can cause failure to any member to which they are fastened, be it a diesel engine, a torque converter, compound, pump or some other attachment.

In another case, several diesel engines powering torque converter equipped excavators experienced rear main (thrust) bearing failures. The front thrust flange of the rear main bearing became badly scored and, in some cases, broke off. It was found that the power train design allowed the torque converter to exert a linear pull on the crankshaft with thousands of pounds of force under full load conditions. The design was changed by the excavator manufacturer to include a thrust bearing to absorb the pull of the torque converter. And the solid connection of the torque converter shaft to the flywheel was redesigned with the result that bearing and crankshaft failures were eliminated.



Improper shimming (described in text) caused this crankshaft failure. The crankshaft broke, as shown, the cylinder block cracked and the rear faces of all the main bearing caps and supports in the block were gouged because of a great forward thrust on the crankshaft.

Improper shimming caused several thousands of dollars damage to another new engine on a drilling rig. In this case, the engine was driving through a coupling into a torque converter and the torque converter was driving into an air clutch. The coupling between the engine and the torque converter was not properly shimmed to allow the crankshaft to float. Instead, the crankshaft was pushed forward with great force.

The result was that the rear flange of the rear main bearing was broken off completely. The engine was run to destruction as the crankshaft broke through the web adjacent to the rear main bearing. The cylinder block was cracked through the rear bearing web and the rear faces of all the main bearing caps and supports in the block were severely gouged because of the great forward thrust put on the crankshaft.

It was also found that the air clutch, fastened to the output shaft of the torque converter was grossly misaligned which, in all probability, was responsible for complete failure of the torque converter.

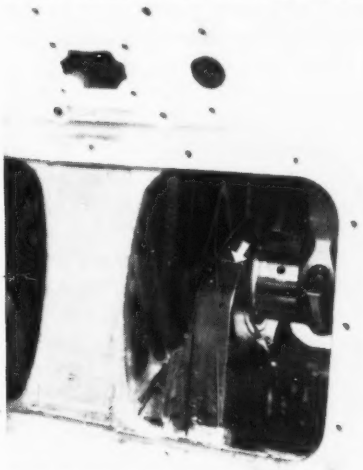
Various physical and metallurgical analysis can be employed to determine if a particular crankshaft failure was caused by manufacturing defects. The type of failure also tells a lot about the cause and gives clues helpful to correcting the problem and preventing recurring failures.

Typical failures:

1. Side loads on the crankshaft can break down the oil film in the bearing, causing seizure. High end loads on the crankshaft not only can score the thrust surfaces of the bearings, but can generate enough heat to reduce the bearing clearance to the point of seizure. Continued running will usually result in a jagged, complete crankshaft fracture near the fillet.

2. High bending type loads, usu-

ally from misalignment of driven machinery, can start a crack in the fillet at the main bearing journal which progresses through the web to the adjacent rod bearing journal.



High bending-type loads on a crankshaft will usually result in a break which starts in the fillet and progresses through the web.

3. Torsional vibration normally fractures a crankshaft at a 45 degree angle. The wide use of torsional vibration dampers keeps this type of failure to a minimum. However, the damper can become overloaded because of added driven equipment or the damper can become damaged. Overspeeding may introduce additional torsional vibrations that can be damaging.

Torsional vibration fractures are characterized by a break at a 45 degree angle, usually toward the rear of the engine.

Modern, heavy-duty diesel crankshafts and bearings are not usually manufactured with defects. Failures are usually the result of external forces created by conditions beyond the control of the manufacturer. Physical and metallurgical tests can show whether or not the engine builder is at fault.

Reducing Electrical Energy Costs

By ERNEST W. FAIR

● One of the brightest areas for reduction of overhead operating costs in any coal company operation is in savings on electrical power costs. In even the best organization there is usually an opportunity to make a small worthwhile savings, in the average firm there exists the chance to procure very sizeable savings and rare indeed is the company setup wherein no such situation exists.

There are many steps which can be taken. Some involve no expense whatever. In a few the initial cost may be sizeable but where such a situation exists the overall savings in months ahead invariably repay those costs.

In paragraphs to follow are many such suggested steps which can be taken to reduce electrical energy costs. Some may apply to a particular firm's operation while others may have no bearing. Rare indeed will be the coal company wherein there will be no such application.

Rearrangment of motor drives, in all probability, can secure savings in almost every organization. Most equipment drives are originally installed with motors of the horsepower and speed specified by the manufacturer of the driven device or machine. Often a 20 hp motor was connected to a 15 hp load just to be on the safe side. In some cases a 10 hp motor was even connected up with no tests having been made to verify proper operating conditions. Of course the motor continued to run and in all probability still runs but in doing so it represents a terrific waste of electrical energy.

However, in the majority of situations operating conditions have been changed and no remodeling has been undertaken to compensate for such changes.

Every single motor drive in the company operation should receive frequent testing to make certain there is no overload or underload for every such case represents electrical energy waste. Motors are always most efficient at full load; they have fairly good efficiency at three-quarter load and very poor at quarter load.

After tests have been made it is often possible to change motors around to provide definite savings on the power bill without purchase of a single new motor.

Get rid of ancient motors. Everyone may point with pride to the huge 1909 motor still turning over and doing a job but it represents a terrific waste of electrical power. Tests have shown that such ancient and heavy motors, at one-quarter load, can lose as much as 41% of the power input. The reason is not one of ageing so much as in the design and construction improvements which have been made since it was manufactured.

A few simple tests on any such installation by the power company engineers or a private expert will reveal surprising figures with respect to electrical energy input and the power output achieved by such ancient motors. Cost of replacement becomes a very minor item when compared with the considerable number of dollars being wasted every day of the year through one's failure to modernize such installations.

Regrouping of operating units offers a third method of reducing electrical energy costs. If no check-up

has been made on power efficiencies for a considerable length of time there is almost certain to be a number of situations where this step can offer definite savings.

This is particularly true where a single motor is used to drive several different pieces of equipment. It exists most frequently with small machines and pieces of equipment for there is where additions to the single power source have been made from time to time without any check on whether or not such additions have altered the efficient operation of the main power source.

This same procedure applies to changing electric motors from one point of operation to another. In several installations it has been found that only two or three such changes need be made to secure very worthwhile savings.

Rearrangement or regrouping of transformers is another advisable procedure to take and particularly where no particular check has been made on this phase of the installation in recent years. At the time transformer arrangements or groupings were set up they undoubtedly delivered maximum efficiency but plant changes in the months and years which followed called for delivery of entirely different output from them.

In some cases, where there has been considerable additions without any compensating step-up in transformer capacities, the savings will be surprising. Here again the cost of installation of larger units will be more than offset by resultant power savings.

Maintenance of proper voltage — never over and never under — is another prerequisite to securing maximum return from one's power bill. Even in operations where it is thought no change could be possible a check-up will often reveal the need for adjustments on regulatory equipment or even installation of more modern units to assure consistent delivery of the proper voltage.

Where power company check-ups are not made frequently it is also often advisable to request that this be done.

Modernization of wiring is often a very worthwhile step toward securing greater return from the money we spend on power each month. This is particularly advisable where considerable additions have been made to existing circuits in the past. Overloaded circuits are always great power wasters. So also are long lines extending from the power source. In many cases losses over such extremely long lines, where no step-up facilities are employed, can be as great as 50 percent.

Where no re-wiring has been done many years it may also be advisable to give serious consideration to complete modernization thereof. There have been great improvements in conductivity and insulation of electrical power wires over the past years. Also, many such lines were installed in the past to serve very minor loads; replacement with heavier wire can alone make a difference.

Loose connections anywhere are wasters of electric power. A periodic check-up should be made not only of circuits themselves but at the power source and on every single installation. It might also be mentioned that such loose connections, in addition to being power wasters, are very definitely hazardous.

Reduction of machine idling time is another step which can be taken in many coal company installations. A running machine that is performing no useful function is very definitely a power waster. Even where this occurs for only a few moments at a time the sum total over a year's period can be very sizeable.

More consistent operation also offers another opportunity for power savings. The unit which is frequently started and stopped during the day is another source of power waste simply because the amount of energy required to break inertia is terrific. It is often better policy to permit such a machine to idle if the period lasts but a few moments. On the other hand should the idling period last from 15 to 30 minutes, as pointed out in the preceeding paragraph, such procedure would be more wasteful than the stop-and-start one.

Be sure **power company meters are checked** at least once a year. They are in themselves just delicate enough to easily get out of adjustment and register improperly. When the accuracy of such a meter is altered it is seldom in our favor. The result can be power dollars spent at the meter before they ever reach our installations.

Usually power company experts check these periodically but under severe weather extremes it is often advisable to see that they are checked oftener. Also, in cases where meters have been jarred or damaged by something striking them, the chances are very great that damage will have been done even though none is apparant. Whenever such an accident occurs a check-up is very definitely in order immediately.

Maximum lubrication attention to everything is also a requirement in obtaining maximum efficiency in use of electrical power. Dry shafts and bearings whether on motors or on the driven machines require more power to turn than those properly lubricated. That always means we are wasting power dollars simply because we are using more than we would need if every such unit were ALWAY properly lubricated.

Better planning in motor usuage can also secure power savings. The employment of a large number of small motors, for example, in an area of continuous operation of all units, may be extremely wasteful if they can be replaced by a large motor delivering power to the entire group. So also will be use of wrong types and kinds of motors on different pieces of equipment. Too frequently an emergency situation calls for a replacement to be made which does not meet such specifications. Since everything keeps running no subsequent correction to proper motor installation is made.

The foregoing, while not all inclusive by any means, represent the major opportunities for cutting electrical energy costs in any coal company installation. Their application will procure a well worthwhile reduction in overhead operating costs.

Look to Caterpillar for the most productive earth-moving equipment. On the following pages you'll see how new D4 and D6 Tractors can mean more production, more profit for you.

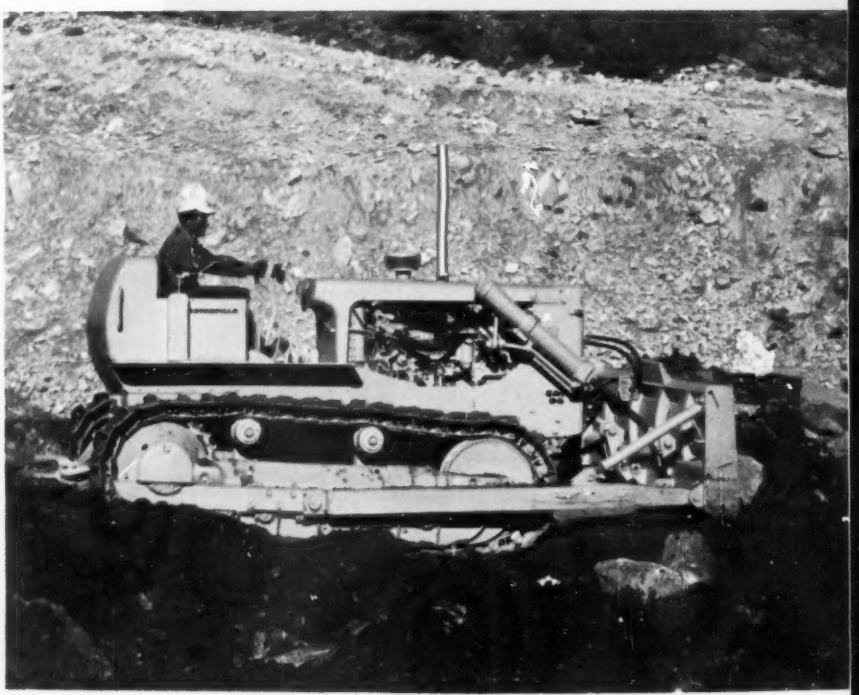
...with the new Series Cat D4 and D6 Tractors

CAT D4 SERIES C and D6 SERIES B TRACTORS

New engines • greater lugging ability • new powerful hydraulic systems • clean, comfortable operator compartment • new time and money saving features • unlimited job possibilities for crawler tractors in their horsepower range.

New 65 HP Cat D4 Series C Tractor

New 93 HP Cat D6 Series B Tractor



ALL NEW CAT D4 SERIES C TRACTOR

Looks all new—and is! New compact high-torque engine develops 65 flywheel HP, 52 DBHP, has 25% more lugging ability • Toughest undercarriage ever developed in D4 HP class, with 14″ ground clearance . . . features selectively hardened rails, counterbored links, 5 lifetime lubricated track rollers • Dry-type air cleaner • 5 forward, 4 reverse speeds with quick forward-reverse lever—the *only* tractor in the D4 class with this feature.

Here is a combination of new power and operator convenience that, coupled with the complete line of tools and attachments, provides opportunities for a multitude of job possibilities.

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The performance leader in its class. The new Series B D6 is more tractor than ever before! It features a new compact engine that delivers maximum horsepower from the heavy, power-packed economy-type fuels . . . 25% greater lugging ability . . . push-button starting available • New governor with lightning-fast response to load changes • New operator's compartment with convenience and comfort • Performance proved features that include the exclusive Cat oil clutch, lifetime lubricated rollers and idlers, hydraulic track adjusters, and the new dry-type air cleaner.

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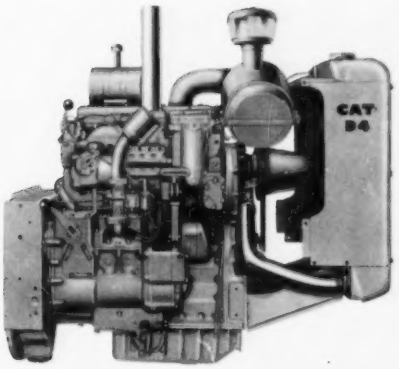
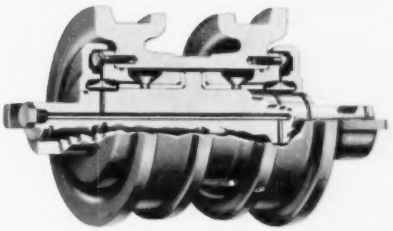
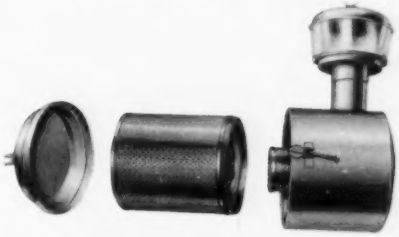


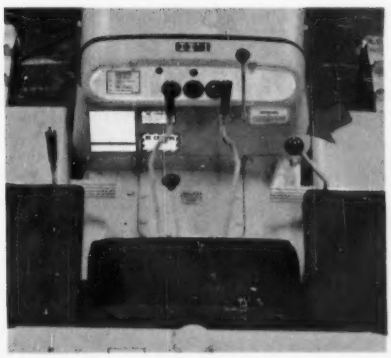
NEW ENGINES WITH 25% MORE LUG—Both tractors have new compact Cat-built Diesels specifically designed for each . . . and for heavy-duty crawler operation—D4 develops 65 flywheel horsepower, the D6 has 93 HP.



NEW LIFETIME LUBRICATED ROLLERS AND IDLERS—All Cat track-type Tractor rollers and idlers are lubricated at the factory and will require no further lubrication until rebuilding. Proved by more than 5 years of testing.



NEW DRY-TYPE AIR CLEANERS—Reduce air cleaner servicing time by at least 75%. Remove 99.8% of all dirt from intake air, even under severe operating conditions or temperatures and at all engine speeds.



FORWARD-REVERSE LEVER—New on the D4, making it the only tractor in its class with this time saving feature. Retained on the D6.

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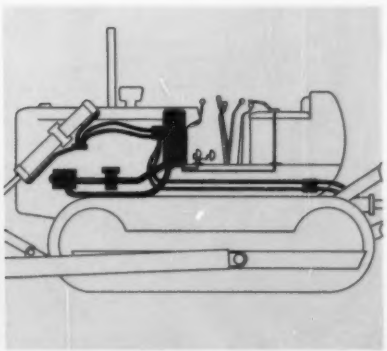
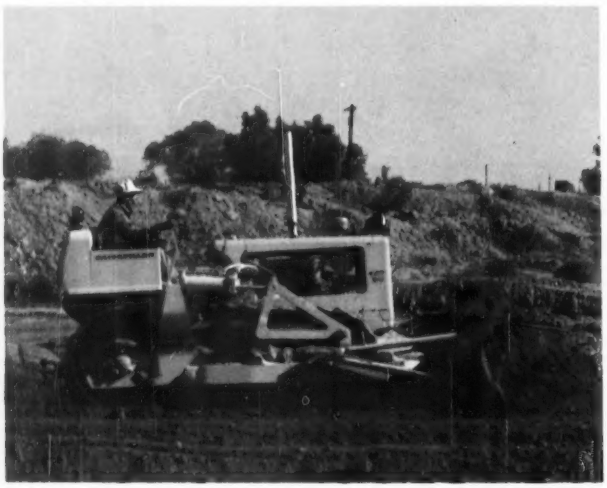


INTEGRAL HYDRAULICS—under-the-hood installations that keep the front and rear of D4 and D6 clear for other mounted equipment and provide efficient power for the many available tools and attachments.

with the new

CAT D4 Series C and D6 Series B TRACTORS



The new look in Cat equipment continues. In recent months, new series in the D9, D8 and D7 Tractors have brought owners great advancements in working horsepower, machine stamina and life, and in the many operator conveniences that reduce fatigue and improve efficiency on any job . . . and there are many new job opportunities.

Look ahead: If you own older equipment, machines that appear to be doing a good job, earning a reasonable profit, you should take time to compare their performance against new Caterpillar products. It could be you are *losing* as much profit as you earn. With all of the new increased working capacities, tools and equipment, and the many time and material savings you can realize in reduced maintenance costs, the new Cat machines can mean new profit potential on your job. Come in now and see the latest D4 and D6 machines. Let's talk over your equipment needs today.

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CM-9

Eight Ball Words In Employee Relations

Your words can be magic or eight-balls in dealing with employees in your coal mine.

By JACK E. BEDFORD
Professor of Management
Armstrong College

• Some words are magic and some are murder. The right word at the right time can smooth over a touchy human relations problem or get good cooperation. The wrong word at the wrong time, even though innocently expressed, can lead to trouble in handling people — put you behind the eight-ball.

IN OTHER WORDS

One eight-ball expression is "in other words." Often in a conference an individual will make a statement. The other person will restate the remark. This is a good technique. It insures that both people are talking about the same thing.

Trouble develops, however, when the re-statement is prefaced with the eight-ball phrase: "In other words."

For instance, an employee comes in with a suggestion for improving safety. He has carefully considered the idea and wants to be sure it is presented right. He says in a most serious manner:

"It is my considered opinion that we can reduce accidents by holding some type of safety contest."

The boss likes the idea. He wants to be sure he has it right. He repeats the idea to be sure he understands it completely. But, he gets himself behind the eight-ball when he says:

"In other words, you think we can reduce accidents if we hold a safety contest."

That is exactly what the employee had in mind. But, he put a lot of thought into the way he said it. He felt he had made a clear-cut, well-phrased statement of the case. Now, the boss says, "In other words."

Reaction can vary. The employee may think, "He missed the whole idea. That wasn't what I said." Or, "maybe I was talking over his head, but I always thought he was fairly intelligent."

The same thing can happen when the statements are reversed. The employee may present an idea in down-to-earth language and the boss repeats it in more profound word with the "in other words" preface.

Now the employee may feel cold water has been thrown on his idea because the words were not the same. He develops an antagonistic attitude and thinks, "Maybe I can't say it as flowery as you do, but I have good ideas."

There are time when it is necessary to rephrase the statement made by another person. It helps get the mental gears of both people meshing perfectly. The way most management-minded men handle this problem is to restate the thought without the eight-ball phrase "in other words."

I MEAN

This is a speech mannerism that many of us use frequently. For instance, when an idea is presented by an employee, it is not uncommon to hear something like this:

"That is a swell idea. I mean, it will need some refinement. I mean, it shows good thinking on your part. I mean, I think we can make this work."

Just what does he mean?

Now let's repeat that statement in a way that keeps the eight-ball phrase out of it.

"That is a swell idea. It will need some refinement. It shows good thinking on your part. I think we can make this work."

By dropping the one cliche phrase "I mean", we have made this statement understandable and more meaningful to the employee who presented the idea. It does away with any confusion that might develop by prefacing every statement with the eight-ball phrase, "I mean."

Many management-men have found that they use this phrase unconsciously. It becomes a speech habit and they are not aware of the

problems that develop when they use it. In fact, they are not even conscious of the fact that they say "I mean" to preface remarks they make.

YOU MISUNDERSTOOD

Every executive has given instructions that were not followed. The employee receiving the instructions failed to do the assigned task in the suggested way, or failed to do it at all.

When this happens there is a tendency to get completely disgusted with the employee. You may be tempted to say, something like this: "You dumb cluck! Can't you follow a few simple instructions?"

This temptation soon passes, however, with the realization that good human relations are most important for a smoothly functioning organization. So instead of the "dumb cluck" response, you temper it with the calm statement: "You misunderstood. Let's try it again."

Obviously, this is a tremendous improvement over the "dumb cluck" retort. It saves an unpleasant scene and helps hold the employee's good will. Since the employee "misunderstood" the instructions he feels he is not entirely to blame.

However, this statement can put the executive right behind the eight-ball. In effect, you are telling the employee he is dumb when you say "you misunderstood." You are pointing out his lack of understanding. He is at fault. And, his natural reaction is to think, "Well, if you could explain it carefully I could understand," or some other thought of simiar nature.

There is a far better way of handling this problem with word magic . . . words that avoid the eight-ball problem. You can say to the employee when he fails to understand, "I failed to make myself clear."

In this statement you are shouldering the blame for the lack of understanding. In the "you misunderstood" statement, you are putting the blame on the other person and you may find yourself behind the eight-ball.

NO

The short "no" is a good way to start arguments. It is blunt. Too brief to be effective. And, it makes it easy for the other person to take charge of the interview with another one word retort "why?" Now, you are behind the eight-ball in dealing with the employee relations problem.

One of the word magic suggestions to avoid this problem is to use the expression, "Yes, but." This shows partial agreement with the other person, yet avoids the argument that can easily develop when you make a flat refusal with the eight-ball word . . . NO.

I

This is the egotistical way to get behind the eight-ball with the words you use in dealing with your employees. It keeps the atention on you as an individual. It makes it hard to shift the blame to a third party if this seems to be the best solution to the problem.

And, "I" is not a word that leads to cooperation on any common problem around the coal mine. It can be improved a great deal when it is changed to "we" instead of "I". This brings others into the act and makes the employee feel more a part of the organization than he does when all he hears during an interview is I . . .

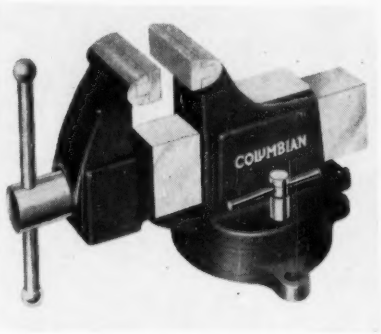
I . . . I . . . I . . .

Just avoiding these eight-ball words will not insure complete harmony with the employees in your coal mine. But, when these eight-ball words are avoided in human relations problems, one of the stumbling blocks for satisfactory handling is removed.

● A new line of machinists' vices, featuring guaranteed unbreakable malleable iron castings, is announced by The Columbian Vise & Mfg. Co., Cleveland.

Vises are available in 7 sizes — 3, 3½, 4, 4½, 5, 6 and 8-inch jaw widths — in both stationary and swivel base types. Stationary vises can be easily converted to swivel base operation by the addition of a new swivel kit, reputed to be an important innovation in vise design. Swivel bases move a full 360° and a forged steel, tapered-gear lock bolt prevents slippage.

Among outstanding new vise features are longer back jaw body, precision-machined nut and keyway which assure perfect alignment. The front jaw beam covers and protects the cold-rolled steel screw. Malleable iron unbreakable front jaw is reinforced with heavy internal ribs. The new vises also have replaceable hardened tool steel "T" jaw faces. These are anchored securely by top drive pins, so they cannot come loose, but are easily replaceable. There are no screw heads or screw holes in the working face.



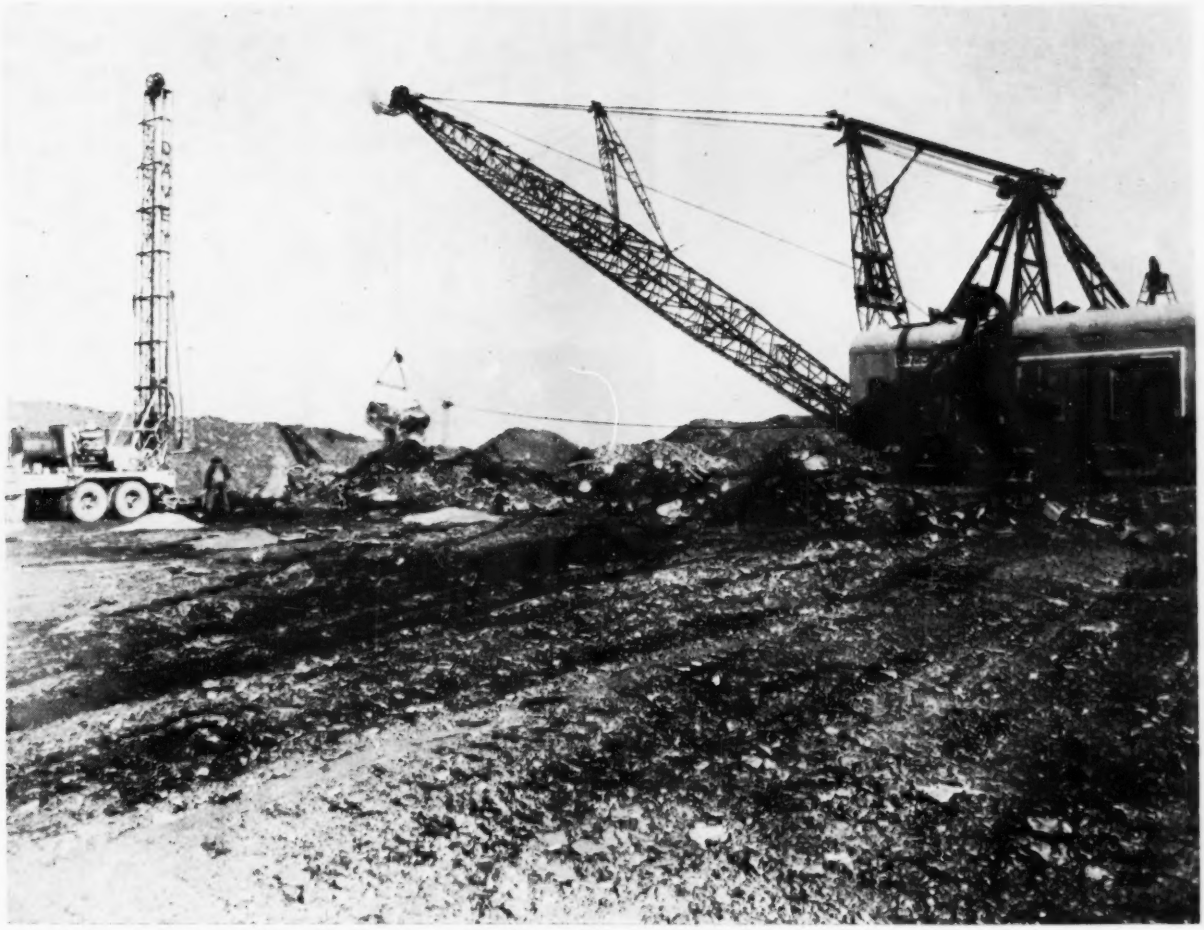
Other advantages of the new vise, as listed by the manufacturer, include handle balls. Forged from handle stock, these cannot come loose. Each new vise is equipped with a graphite bronze thrust bearing. This is claimed to reduce friction, eliminate end play and prevent wear. All vises, except 6 and 8-inch sizes, have large ground and polished anvils.

Complete specifications for new Columbian swivel base vises are:

Columbian
Swivel Base Machinists' Vises

Vise No.	Jaw Width In.	Jaw Open'g In.	Throat Depth In.	Wt. Each Lbs.
603M2	3	4	3	25
603½M2	3½	5	3¼	35
604M2	4	6	3⅜	44
604½M2	4½	7	4⅛	55
605M2	5	8	4¼	74
606	6	10	4⅜	106
608	8	12	6	170

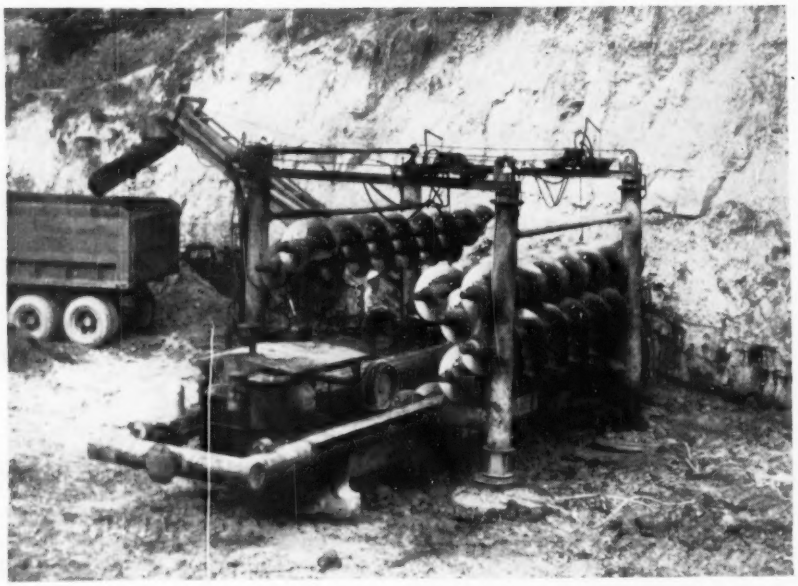
For full details, write the Columbian Vise & Mfg. Co., 9023 Bessemer Ave., Cleveland 4, Ohio. Ask for L-1154A.



Model 725 Page Dragline with 10 cubic yard bucket stripping at the Wilmot, Ohio operation of the Mullet Coal Co.

Back view of a new Manitowoc Model 4500 Dragline with VICON divided power, operating at the Wilmot, Ohio operation of the Mullet Coal Co.

Side view of the new Manitowoc Model 4500 Dragline at the Mullet Coal Co.



● This high-wall recovery auger is getting 300 to 450 tons per shift for Mountain State Coal Company in Lewis County, West Virginia.

It drills to a depth of 160 feet in the Redstone Seam with an average cycle time of 25 minutes. The 33-inch head of the auger carries 24 Kennametal U7TV taper shank cutter bits. These bits often run two shifts without any changes but are replaced before they are dull enough to slow penetration. Bit cost per ton averages 4.3 mills.

Fast operation is promoted also by the bits' taper shanks. Changes are made twice as fast with the U7TV cutter bits as with conventional bits held by set screws—and fewer bits are lost in the hole. These bits are among the latest designs of Kennametal Inc., Latrobe, Pa.

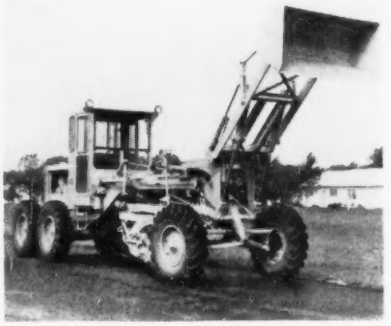
Although the seam is usually not extremely hard cutting, Superintendent Clarence Weekly said, a clay and black rock parting that varies from two to eight inches makes it tough in spots.

● "GraderloadeR", a new one cu. yd. shovel-loader attachment for Caterpillar Motor Graders, was recently introduced by Martin Company, Kewanee, Illinois. Designed for operator convenience, it mounts on the front of the grader, allowing full-vision operation during loading or dumping.

Once the mountings are added to a grader, the "GraderloadeR" can be easily installed or removed in minutes. Using existing connection points on the grader, the "GraderloadeR" quickly attaches to the top and forward scarifier mounts. Two bolts and a transverse pin secure the unit to the grader frame without interfering with scarifier or other grader operations. Because of its front mounting, the "GraderloadeR" bucket can be seen by the operator at all times, without turning around in the seat. Mounting pins with built-in grease reservoirs are used at all points of movement to insure long life and reduced metal wear. Quick-connect hydraulic couplings are used for fast line hook-up.

Built of high-tensile steel for general structural strength, the "GraderloadeR" was designed for fast loading of excess windrow material on road maintenance jobs. Other applications of the "GraderloadeR" are materials handling, backfilling, snow removal and general stockpiling. With a reach height of 11 feet the unit easily clears truck sides and dumps in bed center.

The unit's two lever hydraulic control valve installs at the side of the grader control panel, providing "one-hand" operation of the entire attachment. Reverse-acting hydraulic cylinders provide 18,849.6 lbs. of lift, suitable for handling culverts and other heavy objects. A Vickers hydraulic pump mounts at rear of the Motor Grader engine crankshaft. From ground to full reach height requires only 12.5 seconds.



A new shovel-loader attachment designed for Caterpillar Motor Graders was recently introduced by Martin Company, Kewanee, Ill. Called "GraderloadeR", the new unit has a one-yard capacity and is built for light and medium loading operations on road and highway maintenance, such as excess windrow loading. The construction of the "GraderloadeR" allows it to be used efficiently for general digging and maintenance operation, too.

Design of the "GraderloadeR" provides positive knock-out cleaning action for the bucket through bumper stops on the lift arms. Even sticky materials dump quickly. The abrasion-resistant steel cutting edge, coupled with design of the dump cylinders, allows enough pry action to loosen most materials.

Additional information on the "GraderloadeR" is available through Martin-Caterpillar Dealers, or by contacting Martin Company, 620 Andrews Ave., Kewanee, Illinois.

● The Mining Division of Jeffrey Manufacturing Company, Columbus, Ohio, has announced the appointment of J. J. Larry as Sales Engineer, Beckley Territory, Bluefield, West Virginia district. Larry was previously a Sales Engineer with the home office in Columbus.

Fred Shafferman, formerly at St. Clairsville, Ohio, replaces Larry in the Columbus office. These appointments were announced by R. W. Knode, General Manager of Sales, Mining Division.

FOR HIGH PRODUCTION AND LOWEST OPERATING COSTS—

NOTHING equals the PAGE 700 SERIES SINGLE DECK WALKING DRAGLINE

5 to 22 cubic yard capacities

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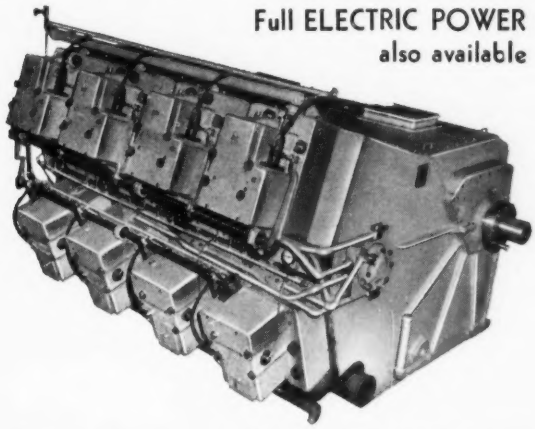
HORIZONTAL V-TYPE DIESEL

Full ELECTRIC POWER also available



The Page Engines powering 700 Series Draglines are designed specifically for dragline work . . . to work longer, at lower cost, with less downtime and maintenance than any other engine. Big bearings, big pistons, a short, stiff crankshaft and slow (450 RPM) speed are only part of the story of why many Page Diesels are still producing maximum horsepower after 20 years of operation. Bulletin WDSD-155 has full details.

Page 700 Series Draglines are rugged, compact, work-horse machines. They are designed and built with the fastest practical hoist and swing speed to reduce cycle time and increase yardage. Page Diesel or full Electric power.

The Page 700 Series Dragline is proof that a fast, efficient, medium-sized machine will *consistently* out-perform larger, but slower machines in virtually every kind of digging.

In addition, initial investment for a Page 700 Series Walking Dragline is considerably smaller, and operating and maintenance costs are lower. *Want more details? Write for Bulletin WDSD-155 today. There's no obligation.*

FRANK SWABB EQUIPMENT CO.

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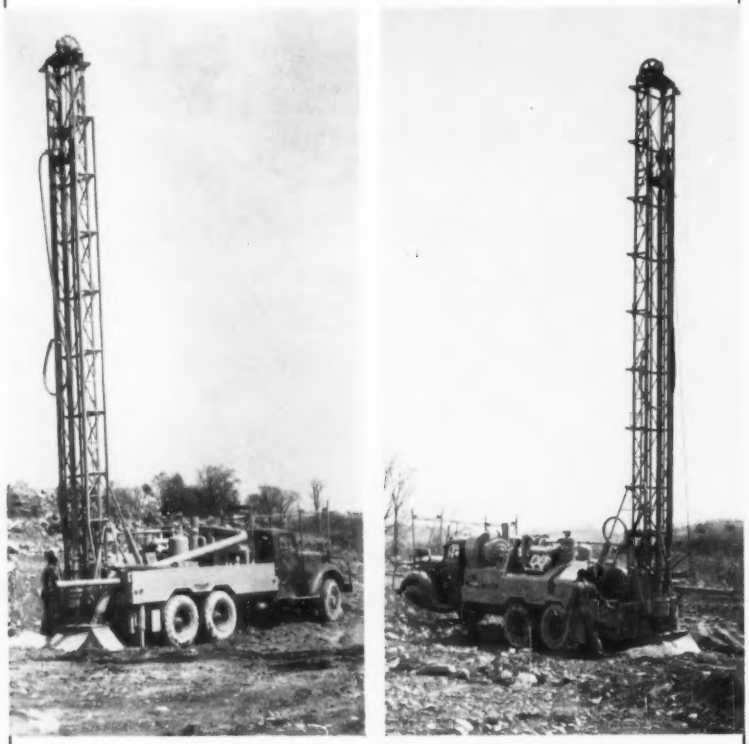
Automatic Dragline Buckets
Walking Draglines

Lima 2400 . . . Harold A. Siegel Coal Co., Fryburg

DAVEY Rotary Drills cut coal drilling costs!



Davey Model 8-MA at U.S. Coal Co., Holloway, Ohio.

For more economical, faster drilling . . . increased production at reduced costs, leading strip operators rely on Davey.

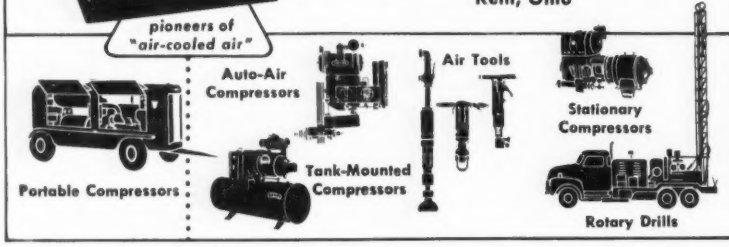
Suitable for mounting on any make of truck, Davey Rotary Drills move fast between blast holes . . . are ideal for low cost core drilling with air . . . easy to set in drilling position.

Daveys are offered in 8 different truck-mounted models—air blast, mud pump or combination types. Rated capacities to 3,500 ft. Features include choice of power take-off or separate power unit operation, automatic hydraulic feed with manual override, heavy-duty rotary table and rugged tubular box-type mast. Tractor mounted drills also available. A-232A

Write for Bulletin E-702S!

DAVEY pioneers of "air-cooled air"

DAVEY COMPRESSOR CO.
Kent, Ohio



● To process its Northern West Virginia coal, much of which is used for steam generation in electric utility power plants, Eastern Gas and Fuel Associates will construct a new coal cleaning and preparation plant at its Federal No. 1 mine at Grant Town (near Fairmont), W. Va.

The facility will enable Eastern to maintain a constant supply of the uniformly high-quality fuel required for utility and other uses, company officials said. It will be able to process 12,500 tons of coal per day.

Designed by Eastern's Engineering Department, the plant will include the most modern coal-treatment methods in use today — heavy media washer, diester table, and froth flotation. The heavy media washer is designed to prepare coarse coal and the diester table and froth flotation will clean the fine coal.

The new coal-processing plant represents the final stage in a major improvement and expansion program at the Federal mine. A new shaft, skip hoist, and auxiliary facilities — including 8,000 feet of underground mine track—were completed in 1958. Last year approximately 600 large mine cars were acquired. Eastern operates mines in northern and southern West Virginia and Central Pa. The new Federal facility is the newest in a series of modern cleaning plants installed at company mines.

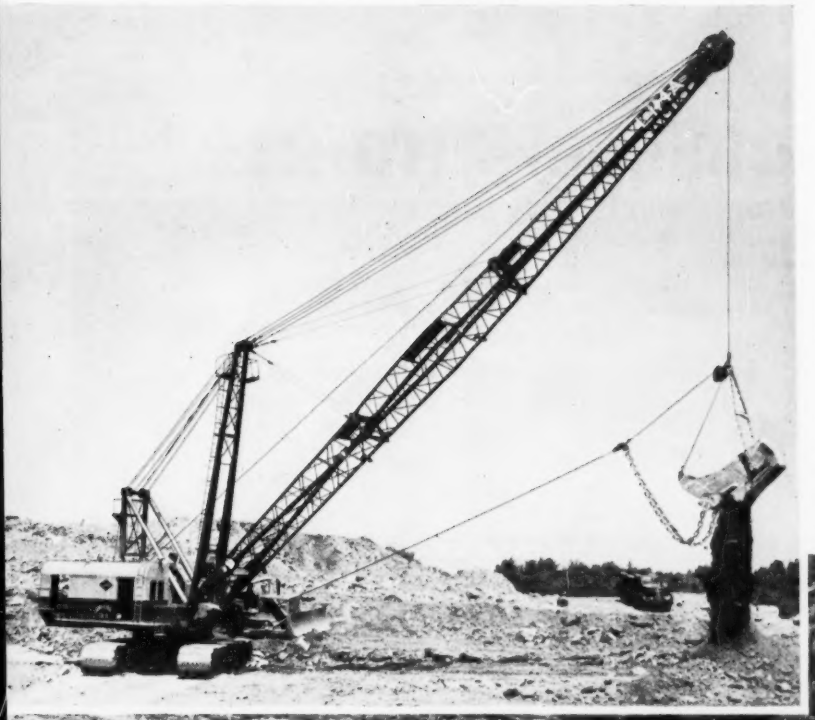
Ground-breaking for the new Federal plant is scheduled for this fall, with completion in the latter part of 1961. Coal-mining operations will continue normally during the construction period.

● How ripping can increase earth-moving profits is described in a new 8-page brochure just released by Caterpillar Tractor Co. It is titled "Caterpillar Rippers."

The illustrated brochure gives construction details and operation of rear-mounted, hydraulically-operated rippers for the Caterpillar D9, D8, D6 and D4 Tractors and No. 977 and No. 955 Traxcavators.

Copies of "Caterpillar Rippers" may be obtained at Caterpillar dealerships or by writing the Advertising Division, Caterpillar Tractor Co., Peoria, Ill., requesting Form 33557.

Lima 2400 . . . Harold A. Siegel Coal Co., Fryburg



Why more mines use Lima 2400s from Highway

Lima 2400 . . . Shawville Coal Company, Inc., Shawville

Lima 2400s are big production machines that are built for toughest service. With air actuated clutches and heavy-duty brakes, they do more work at less cost . . . stay on the job with minimum maintenance.

Operation is smoother and easier, too. Diesel engine with torque converter reduces loading shock and eliminates engine stall. Choice of mountings and power plants.

Get the complete Lima 2400 story from your Highway representative today!

A-1026A

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Asco Mining Co. maintains production schedules with Allis-Chalmers HD-21s

Asco Mining Co. uses Allis-Chalmers HD-21s to cut costs and boost production.

Allis-Chalmers HD-21 clears way for dragline at Asco Mining Co.

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Modern design . . . sturdy construction . . . 'round-the-clock service!

Like Asco Mining Co., Knox, you can expect all this *and more* on every piece of Allis-Chalmers equipment from Highway. A-826A

Highway

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Beckwith Extends Pittsburgh Hours In Parts And Service Departments

MR. WILLIAM H. DICKEY
Vice President and General Manager
Beckwith Machinery Company

● In a move to expedite repairs of earthmoving equipment for owners in the immediate area, Beckwith Machinery Company has gone to a two-shift operation in the Parts and Service Department of its Pittsburgh location. Mr. William H. Dickey Vice-President and General Manager, announces that these Pittsburgh departments are now open from 7 A.M. to 11:15 P.M. weekdays.

Parts and service requirements can be filled from 8 A.M. to 12 noon on Saturdays, Mr. Dickey indicated. He further pointed out, "As a service organization, we are actually available around the clock, around the calendar. If an owner of a Caterpillar tractor or Bucyrus-Erie shovel needs repair assistance at four in the morning, we'll have the necessary people on the scene."

Owners using Beckwith's main shop under these new hours can get their repair jobs or rebuilt machines out in half the number of days, without extra cost, he emphasized.

Additional customer advantages claimed are for earlier dispatch of field servicement to customers jobs, more convenient hours for pick-up of parts by the single machine owner-operator late in the evening or early in the morning.

Beckwith Machinery Company is the authorized Caterpillar Dealer in western Pennsylvania, parts of West Virginia and Maryland. In addition to Caterpillar earthmoving machinery and diesel engines, Beckwith sells and serves Bucyrus-Erie excavators, Athey products, Hyster winches and other allied products.

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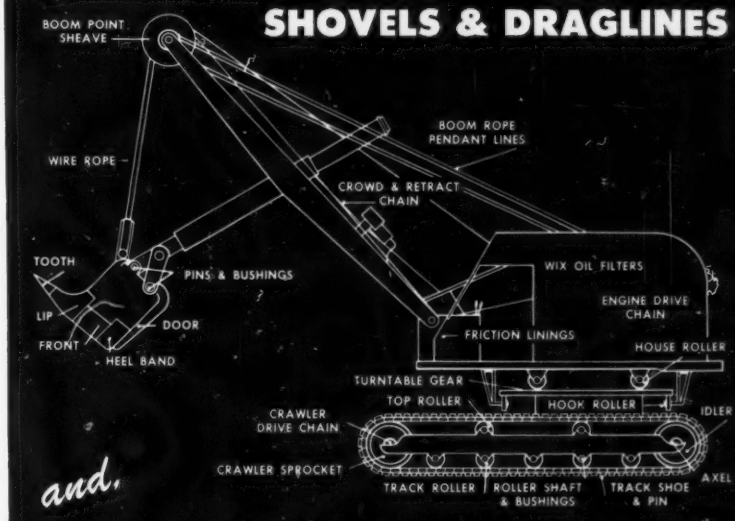

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In a most modern and well equipped rebuilding shop

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TRACK SHOES • TRACK IDLERS • TRACK SPROCKETS • BUSHINGS
HOOK ROLLERS • HOUSE ROLLERS • TRACK ROLLERS • SHAFTS • DIPPERS

MAXIMON MACHINE COMPANY, INC.

ALTOONA, PA. • 801 N. LOGAN BLVD. • WINDSOR 3-1156
GROVE CITY, PA. • HARRISVILLE RD. (RT. 58) • PHONE 1422

● Latest improvements to the "King of the Crawlers," the D9 Series E Tractor, are fully described and design features explained in a well illustrated 16-page booklet recently released by Caterpillar Tractor Co.

The largest single-engine track-type tractor in production today, the 335 horsepower D9 Series E is available with three different transmissions — direct drive, Power Shift and torque converter. Advantages, operating characteristics and maximum drawbar pounds pull available with each type are given.

The direct drive model is equipped with the long-lived Caterpillar oil clutch. The catalog explains how an oil film is circulated under pressure between four metallic-faced clutch discs to cool and lubricate the clutch, allowing little opportunity for wear or heating. Transmission on this model is constant-mesh, with a forward-reverse lever and six speeds in either direction.

Torque converters in the new D9 are designed especially for this tractor, and the booklet shows how they permit exceptionally great pulling power because of their inherent stall torque ratio. A constant-mesh transmission gives three speeds forward and two in reverse.

The ability of the Power Shift transmission to combine the positive operating feel and "snap" of direct drive with a torque converter's anti-stall characteristic is graphically explained through use of cutaways and schematic drawings. These show the flow of power and workings of the five sets of interconnected planetary gears.

Convenience of the operator's compartment and the ability of operators to work at greater efficiency is also outlined in the booklet, which points out that the seat is fully adjustable, the tractor deck is flat and clear of obstructions, concole mounted controls are easily reached and exceptional visibility is created by the in-line stacks, tapered hood and specially designed fuel tank.

A complete listing of all matched equipment for the new D9 Series E Tractor is given. These include the new hydraulic control units for straight, angling and "U" blades as well as the cable controlled units. There are three different hydraulic controls available — the No. 184 for bulldozer, ripper and/or tilt cylinder; the No. 50 for ripper and/or tilt cylinder; and the No. 143 for tilt cylinder. Two scrapers are mated with the D9, the 27 cu. yd. struck capacity No. 491 and the 22 cu. yd. struck capacity No. 463. The No. 9 Ripper is also available.

Copies of the brochure are available from Caterpillar Dealers or by writing Caterpilar Tractor Co., Peoria, Illinois for Form 33443.

Upper: Caterpillar D-9 tractor strips overburden and pushes stripping shovel spoil at the B & B Coal Co., Mt. Clare, W. Va.

Lower: Left to right: Mr. Joseph Barnosky and Mr. Paul Barnosky, owners of this D9 Tractor.

Dumping reach and superior machine balance are features of the Cat Rubber Tired Traxcavator. Here a test machine holds a load at full lift height of 12 feet, while moving to dump into a transporting vehicle. It is built in sizes up to 2.75 cubic yard bucket in front or side dump models.

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JOY EQUIPMENT—REBUILT

3—Joy 14BU Loaders, low pedestal, 7AE, '56 & '57.
6—Joy 14BU Loaders, medium pedestal, 7RBE.
4—Joy 14-BU 3PE Loaders.
2—12BU10E Joy Loaders complete with Piggy-backs.
2—Joy 12BU Loaders, 9E, latest type.
1—Joy 20BU Loader, latest type.
2—Joy 11BU Loaders, latest type.
1—Joy 8BU Loader, 34" overall height.
2—Joy 8BU Loaders, 220 volt AC.
1—Joy curved Bar Head, complete.
6—Reliance 24-J Motors, 7½ H.P.
10—Reliance 38-J Motors, 10 H.P.
20—9-J Motors, 4 H.P.
2—Goodman 660 Loaders on Crawlers 440 volt DC, like new.
1—Goodman 660 Loader on Crawlers, excellent 250 V. DC.
1—Goodman 665 Loader on Crawlers, latest type 250 V. DC.
1—Goodman 865 Loader 26" hi. Rebuilt. 250 V. DC.
4—Joy 8SC Shuttle Cars, Rebuilt.
4—Joy 6SC Shuttle Cars, rebuilt, latest type.
1—Joy 5SC Shuttle Car, Excellent
2—Joy 32E9 Shuttle Cars.
2—Joy 32E10 Shuttle Cars, rebuilt.
2—Joy 32E15 Shuttle Cars, rebuilt.
4—Joy 32E16 Shuttle Cars, rebuilt.
2—Joy 42E16 Shuttle Cars, rebuilt.
2—Joy CD-22 Drill, on rubber, like new.
6—Joy T-2-5 low pan Crawler Trucks, rebuilt.
1—Joy T-2-6 low pan Crawler Truck with reel.
2—Joy T-1 Standard Crawler Trucks, 220 AC.
1—Joy T-1 Standard Crawler Truck, 250 DC.
2—Goodman low pan Crawler Trucks, like new latest type.
4—Joy 11-B Cutting Machines, like new, 35 and 50 H.P.
1—Joy 7-B Cutting Machine, like new, 250 volt DC.
2—Goodman 212 Cutting Machines, 19" high.
4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
1—Goodman Machine on Crawler, 31" high. All hydraulic.
6—Goodman 512 Machines with Bugdusters.
6—Goodman 612 cutting machines, 250 and 500 volt.
1—Lee Norse low vein Machine Carrier on rubber.
1—Jeffrey 70 URB rubber tired Cutter. Universal head, perfect condition.
1—Joy 11RU Rubber Tired Cutter with bug-dusters, Universal heads, like new. 250 V DC.
2—Joy 10RU rubber tired cutters Universal head, 220/440 volt AC, perfect.
6—7AU's on track. Universal head.
2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on Crawlers, 250 volt DC.
1—Jeffrey 29LC on Crawlers, rebuilt.

LOCOMOTIVES

1—Goodman 6 ton, 93-A, 27" high, armor plate frame.
1—Jeffrey 15 ton MH-77 Locomotive, Armor Plate frame.
3—Jeffrey, 13 ton, type MH-110, 36", 42", 44" ga.
2—Jeffrey, 10 ton, type MH-110, 42" and 44" Ga.
2—Jeffrey 10 ton type MH-78, 42" & 44" Ga.
2—Goodman 8-30 and 10-30 Locomotives, 26" above rail.
1—Jeffrey MH-124, 6 ton, 24" overall height.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
4—Jeffrey, 8 ton, type MH-100, 2½" armor plate frames.
1—Jeffrey, 6 ton, type 2186, 22" above rail.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
1—G. E., 4 ton, type 825 Locomotive, 22" high.
10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809 Locomotives, 42", 44" 48" Ga.
2—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Westinghouse, type 90., 4 ton, 42" and 48" Ga.
2—Atlas Battery Locomotives, 36" Ga.
1—Atlas Trolley Locomotive, 4 ton, 24" high.
2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
8—Jeffrey MH-78 Locomotive Units, cheap.
4—Jeffrey MH-88 Locomotive Units, real bargains.
6—Jeffrey MH-100 Locomotive Units, reasonable.
3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.
Locomotive Trucks and Spare Armatures for all the above.

TIPPLE EQUIPMENT

1—Complete Five Track Tipple with Washers and Air Tables.
2—Complete Tipples, 3 and 5 track, steel and wood.
3—Cleaning Plants, 1 Ea. McNally, Roberts and Schaefer, Jeffrey, Washers and Airflo Tables.
4—complete Aerial Trams for coal or refuse.
3—complete Rope and Button Lines.
2—Monitor Lines complete with Drums, excellent.
1—Allis-Chalmers 5' x 12' Rippflo Vibrator
1—Allis-Chalmers 4' x 12' Low-Head Vibrator
1—Robins Gyrex Vibrator 4x10.
10—Belt and Apron type Loading Booms.
6—Shaker Screens
1—Robins Car Shakeout.
20—Crushers, various sizes—Jeffrey McLanahan &McNally
4—Mine Scales, 10 & 20 tons.
5—Truck Scales, 25 to 40 tons, late type.
Feeders, Belt and Drag Conveyors, Car Retarders, etc.

CUTTING MACHINES

2—Joy 10RU rubber tired cutters, Universal head, 220/440 volt A.C. Perfect.
1—Joy 11RU, rubber tired Cutter, 250 V. DC.
1—Jeffrey 70 URB Cutter, rubber tired, Universal Head, low vein.
2—Jeffrey 29UC Universal Machines on Crawlers.
1—Goodman on Crawlers, 31" overall height.
3—Baby Goodman 212's, rebuilt, 250 Volt DC.
2—Goodman 212 Cutting Machines, 19" high.
4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
6—Goodman 512's with Bugdusters, like new.
4—Goodman 512's, rebuilt, or as removed from service.
3—Goodman 112's 220/440 volt AC.
1—Joy 7-B Cutting Machine, 250 volt DC.
4—Joy 11B Cutting Machines, rebuilt. 35 and 50 H. P.
6—7 AU's, on track, Universal head.
10—Goodman 12AA's and 112AA's, 250 volt DC.
2—Goodman 324 Slabbers.
2—Goodman 724 Slabbers.
2—Goodman, 824 Slabbers.
6—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's on low vein trucks.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on track.
1—Jeffrey 29C's, track mounted.
2—Jeffrey 29L's on Crawlers. Excellent.
3—Sullivan CE7, 220 volt AC.

CONVEYORS

2—Robins 36" tandem drives with or without structure.
2—Joy 30" Underground Belt Conveyors, excellent.
1—Goodman 97-C, 30" tandem drive, 1500' long.
2—Goodman 97-C, 26" Conveyors, 1,000' long.
1—Robins 30" Belt Conveyors 1000'.
1—Jeffrey 52-B, 30" Drive and Tail Assembly, complete.
2—Joy MTB 30" Drive and Tail Assembly, complete.
4,000 Conveyor Belt, 36".
1,000 Conveyor Belt, 30".
4,000 Conveyor Belt, 26".
8—Jeffrey 61AM 12" Chain Conveyors, 300'.
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300'.
2—Joy 15" Room Conveyors, 300'.
2—Joy 20" Conveyors, 300'.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
1,000' Goodman 18" Flat Belt Conveyors, tandem drive, any length. Perfect.

CONVERTERS AND DIESEL PLANTS

1—300KW Portable Rectifier, 3 card unit. Excellent.
2—500KW G. E. Stationary Rectifiers
4—1,000KW Stationary Rectifiers.
2—100KW, G.E. TCC-6's, 275 volt, Rotary Converters
1—150KW, G. E. HCC-6, 275 v., Rotary Conv.
1—150KW, 6 phase, Allis Chalmers Rotary Converter, 275 V. DC.
2—200 KW, G. E. HCC-6's Rotary Converters, 275 V. DC, Newly rewound.
3—300KW, G. E. HCC-6's Rotary Converters, 275 V. DC, like new
2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
2—500KW Westinghouse Rotary Converters, 275 volt DC.
2—200KW Westinghouse Rotary Converters, 275 V. DC. Newly rewound. (all the above with 6900/13000 and/or 2300/4000 primary transformers)
2—100 KW MG Sets, 275 volt DC.
2—150KW MG Sets, General Electric and Westinghouse, 275 V. DC.
1—200KW MG Set, Westinghouse, rebuilt, 275 V. DC.
1—200KW MG Set, General Electric, perfect. 275 volt DC.
2—300KW G. E. MG Sets, like new.
1—300KW Westinghouse, 600 volt, MG Set, rebuilt.
2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
2—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
2—500KW HCC-6's Rotary Converters, 6 phase, 600 volt DC.
1—GMC 471 Diesel with 60 KW, 250 volt DC Generator.
2—GMC-671 Diesels with 75 KW, 250 volt DC Generators.
1—Cummins 125 KW, Diesel with 250 volt DC Generator.
1—Allis Chalmers Natural Gas Engine with 100 KW Generator, 275 volt DC.
Boilers, like new, 500 H.P.

LOADING MACHINES

16—Joy Loaders, 14BU, 12BU, 8BU, 11BU, 20BU.
3—Joy 12BU9E Loaders, latest type.
2—Joy 12BU with Piggyback Conveyors.
2—Goodman 865 Loaders, 26" on Crawlers.
1—Goodman 665 Loader on Crawlers.
2—Goodman 660 Loaders, 440 volt AC perfect.
1—Goodman 660 Loader, on Crawlers.
1—Goodman 460 rebuilt, on track.
2—Jeffrey 61 CLR's, on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley, No. 3 Automatic Loaders
2—Clarkson Loaders, 26" above rail.

MISCELLANEOUS

1—Complete Five Track Tipple with Washers and Air-Tables.
5—Complete Tipples, 3 to 5 Track. Wood and Steel.
Steel Trestles for drop bottom cars.
All Steel Armco Buildings.
20—Jeffrey Molveyors on rubber tires.
1—¾ Yard Shovel and Back-Hoe.
1—¾ Yard Crawler Crane.
Battery Supply Tractors, rubber tired.
1—Cantrell Air Compressor on rubber tires.
10—Air Compressors, 1 H.P. to 40 H.P.
2—Joy self propelled rubber tired compressors, 240 cu. ft.
2—Acme self propelled rubber tired compressors, 130 cu. ft.
40 Mine Pumps, all types.
1—Differential 40 Passenger Man Trip Car.
6—MSA Rock Dusters.
2—Phillips, Carriers, 44" and 48" Ga.
1—Barber Greene self propelled Bucket Elevator.
Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
300 Mine Cars, drop bottom, 42" Ga.
90 Mine Cars, drop bottom, 44" ga.
50 Mine Cars, drop bottom, 48" Ga.
100 Mine Cars, 18" high, end dump, 44" Ga.
300 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
1—10 ton Mine Car Scale with Recorder.
15—Brown Fayro HKL and HG Car Spotters.
1—Brown Fayro Hydraulic Car Spotter.
1—12 ton Differential Slate Larry.
Incline Hoists, 25 to 50 H.P.
1—Jeffrey 5' Aerodyne Fan, like new.
1—Jeffrey 6' Aerodyne Fan.
2—Storage Tanks, 4,000 Gallons.
2—Storage Tanks, 10,000 Gallons.
10,000 Five Gallon G. I. Cans, screw lids.
2,500 tons Relaying Rail, 25 lb., 30lb., 40lb., 50lb., 60lb., 70lb.
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Thousands of feet of rubber covered three conductor cable. All sizes.
300 Transformers from 1 to 300 KVA, 110 to 13,000 primary volts.
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Huge stock of Mine Supplies.
500 MSA Mine Lamps, Chargers, etc.
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TOOLS

Wherever temple spires arise,
Wherever children trudge to schools,
Always before their watchful eyes,
Is seen man's handiwork with tools.
All that of beauty greets the eye,
The streets, the churches and the schools,
Announce to the passer-by,
All things of earth are made with tools.
The world would still a jungle be,
Had man not fashioned tools to aid.
No ship today would sail the seas
Without the tools which man has made.
That extra strength all men require;
The distant goal they seek to gain;
Is profit of the ore and fire
Which give to them both ship and plane.
With tools the busy streets were paved.
With tools the spires of temples rise.
Without them nothing could be saved,
The wisest men would not be wise.
With tools men stronger grower to be.
With tools both train and vessel run
In sky, on earth and land and sea
With tools the work of life is done.

— Edgar A. Guest

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9-W Bucyrus Erie Elec. Drag, 165', 10 yd.
9-W Bucyrus Erie Diesel Drag, 165', 12 yd.
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7400 Marion Diesel Drag, 175', 13 yd.
625 Page Diesel Drag, 150', 10 yd.
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2400 Lima Diesel Drag, 130', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus-Erie Elec. Drag, 115', 5 yd.
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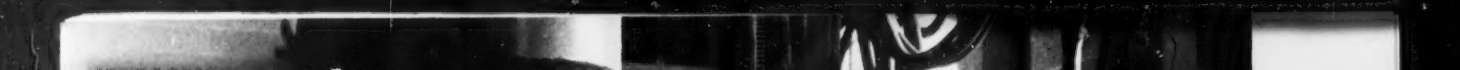
5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus-Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ and 5½ Yd. H. L. Shovels
120-B Bucyrus-Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
1201 Lima 3½ Yd. Standard Shovel
111-M Marion Standard & H. L. Shovels
3500 Manitowoc Standard & H. L. Shovels
54-B Bucyrus-Erie Standard & H. L. Shovels
Model T-650 REICHdrill, Truck Mounted Rotary and Down-The-Hole
Ingersoll-Rand Truck Mounted Drillmaster
Joy Truck Mounted Rotary Air Drill 6" Holes.
McCarthy & Compton Coal Auger Drills
Euclid Trucks, Dozers, Attachments, etc.
Frank Swabb Equipment Co., Inc.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

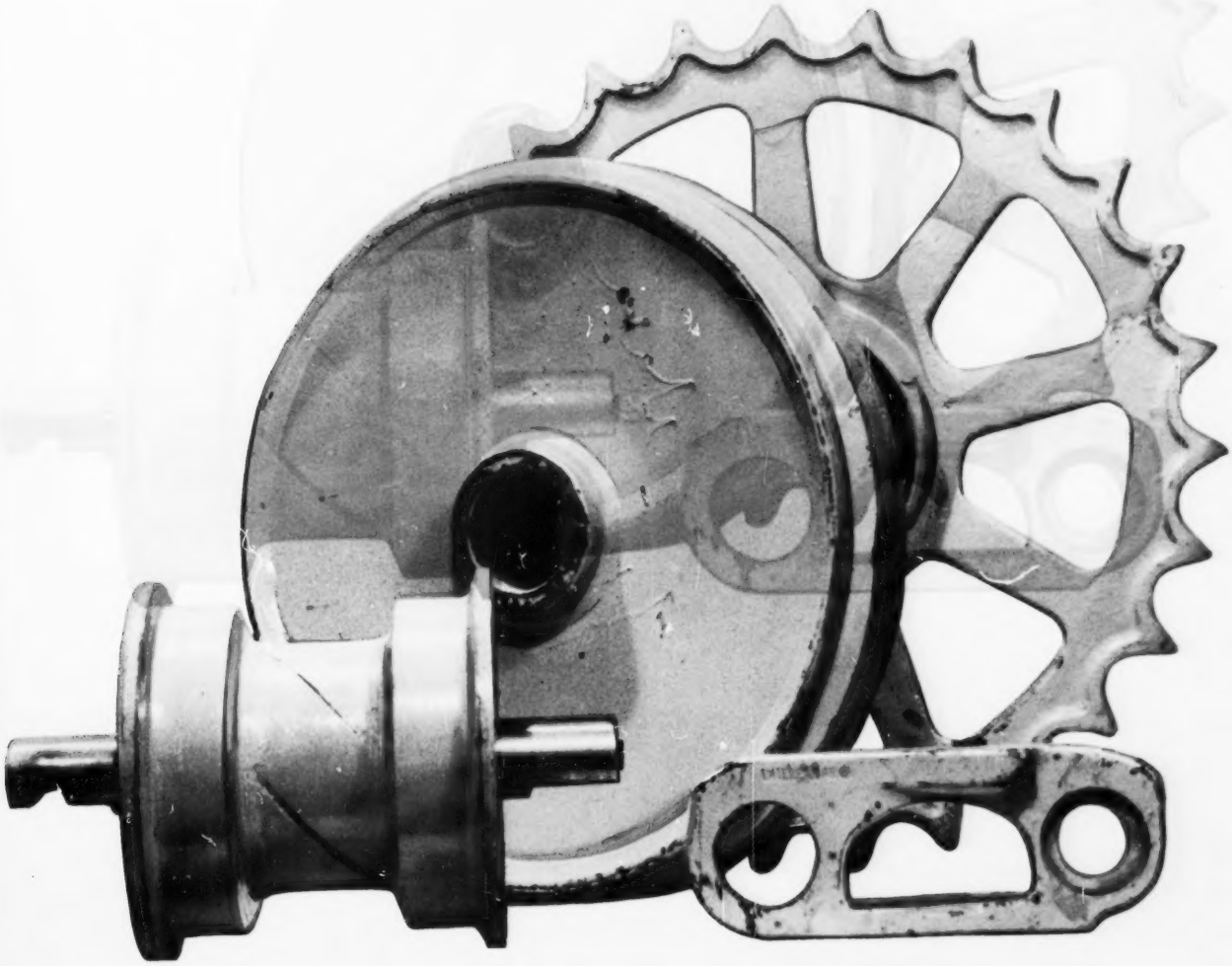
SALEM "HERCULES" AUGERS FOR ELECTRIC DRILLS
Made to Withstand High Drilling Speed Whip And Torsional Strain Of Electric Drills.

Drills holes faster — Will not snap off shank or chip points — Outlasts four or five ordinary augers.
THE SALEM TOOL COMPANY EDgewood 7-3416 SALEM, OHIO, U.S.A.



TWO LIVES FOR CAT

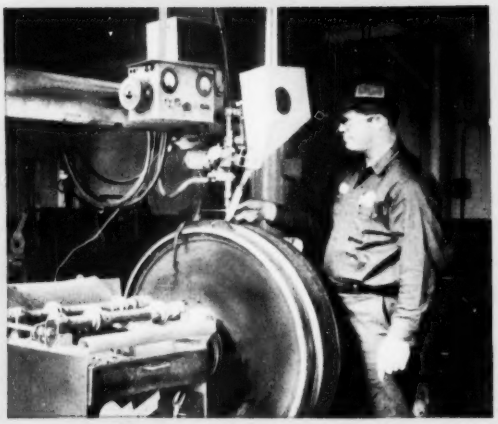
Rollers Links Idlers Sprockets



Now you can save 30% to 50%

Get at

New metal is bonded to both wear surfaces simultaneously on this eight spindle roller welder. Only one double pass is made at a time to allow new metal to cool before the next bead is laid on, guarding against shell distortion, porosity and cracks. A deep permanent bond is made with the original metal of the shell. Special alloy rod gives a tough wear surface which work-hardens on the tractor. Above, the machine is tipped while a roller flange is built up. At right, front idlers get a new wear surface on this submerged arc welding machine.



Rails are renewed by this completely automatic double welder. A special rod creates a new wear surface which combines hardness with stretch and impact-resistance. This equipment can build up the roller-worn surfaces on the rails of practically any crawler-type machine.

Now you can save 30% to 50%

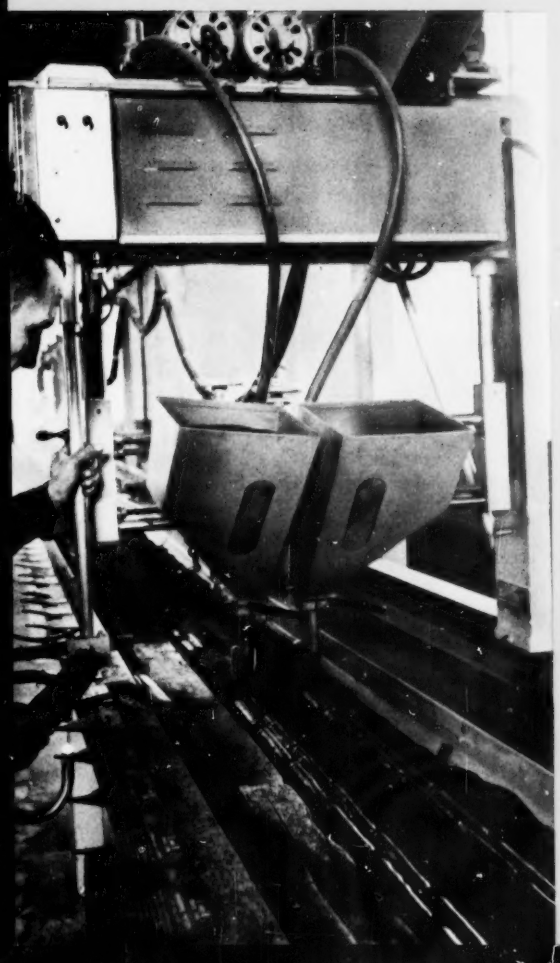
rebuild worn track parts at Ohio Machinery Co.

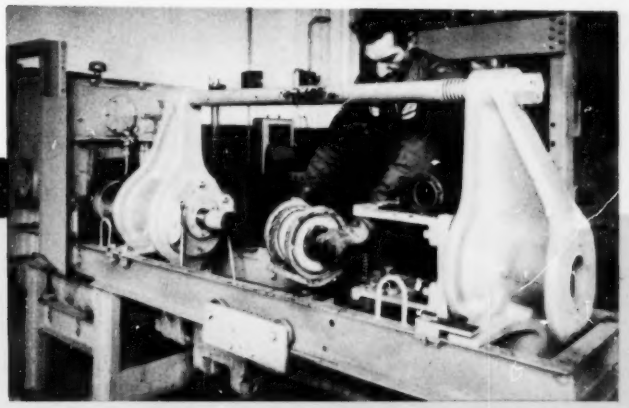
The most modern undercarriage rebuilding facility in Ohio now brings bigger savings, faster service than ever before possible for track-type tractor owners. A new $100,000 welding wing in Cleveland—plus welding equipment in the Columbus and Cadiz branches—puts a quality rebuilding service within easy reach of practically every equipment user in our territory.

Using special submerged arc welding machines, skilled technicians build up worn roller and rail surfaces to new dimensions with costs as low as half the price of new parts. At the same time, wear surfaces welded by Ohio Machinery Co. almost equal the quality and life of new parts.

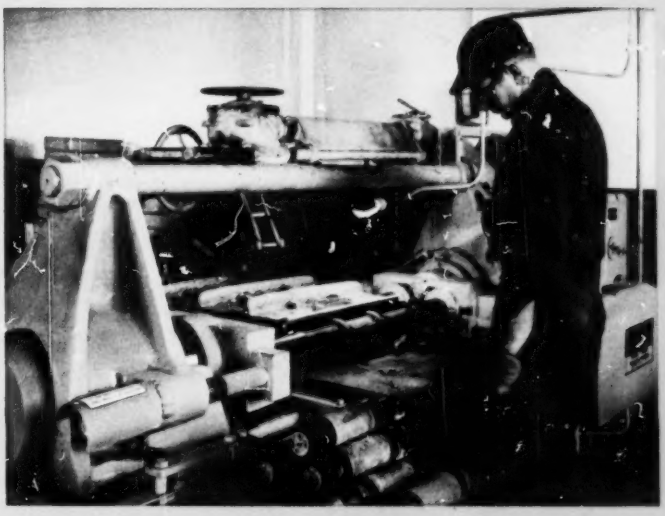
Here's the story of how this extra quality and speed is made possible by Ohio Machinery's new welding wing in Cleveland.

st two lives from genuine Cat undercarriages





Careful reassembly of rollers is a vital part of the rebuilding process. On SWAP rollers, new parts including shafts are installed automatically, if they do not measure up to new dimensions.



Track press removes a pin and bushing simultaneously for turning or replacement with new parts. A special air wrench attached to this press removes track bolts, makes possible the reuse of from 80% to 90% of the track hardware.

Is rebuilding always the best answer for you?

When in doubt
CALL
an expert

Our parts and service specialists are waiting to serve you. Their only job is to make sure you get the most economical, trouble-free performance from your Caterpillar equipment. Call the one nearest you — and while you're at it, ask him to bring along a free wear gauge which will enable you to catch worn track parts in time for rebuilding.

CLEVELAND . . . . LAfayette 4-2911
Jim Clemens . . . . . BE 6-6339
Dick Hall . . . . . IM 7-7215

COLUMBUS . . . . . HUdson 8-9703
Ron Brockway . . . . . TR 6-6625
Dean Sharp . . . . . AM 8-6611

TOLEDO . . . . . JEfferson 6-3701
Lima Area
Harold Smithberger . . . . CA 2-5941

YOUNGSTOWN . . . STerling 2-8161
Charles Haberkorn . . . . SW 2-2565

CADIZ . . . . . Phone 465
Cal Clark . . . . Mt. Pleasant 8-6196

Another Ohio Machinery Company service to help you build bigger profits with Caterpillar equipment.

Not necessarily. When your undercarriage is worn and ready for replacement, you have three ways to put it back in working condition. Ask your parts and service representative to recommend the most economical way for you:

REBUILD—Usually the least expensive, rebuilding offers a real bargain in undercarriage maintenance. However, rails, rollers and idlers cannot be worn beyond the limits shown on your wear gauge if you want a risk-free rebuilding job.

SWAP—The fastest way to have rebuilt and guaranteed parts is to SWAP them at Ohio Machinery Co. You merely bring in your old parts, walk out with the rebuilt SWAP assemblies. You are billed according to standard prices listed in our SWAP catalog.

REPLACE—If your undercarriage parts are too worn to rebuild or SWAP, then new parts are the answer. Ohio Machinery's large stock of genuine Cat parts insures fast service. And the careful design and quality workmanship of new genuine parts guarantees long life, low maintenance cost per hour.

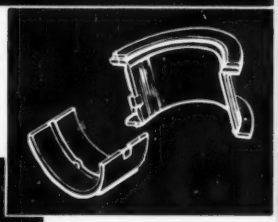
Cat and Caterpillar are Registered Trademarks of Caterpillar Tractor Co.

OHIO MACHINERY CO.
CLEVELAND • COLUMBUS • TOLEDO • YOUNGSTOWN • CADIZ

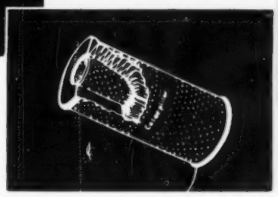
How powering your excavator with the Cat D397 (Series D) from BECKWITH will give you an edge over competition . . .

engine power BY CATERPILLAR

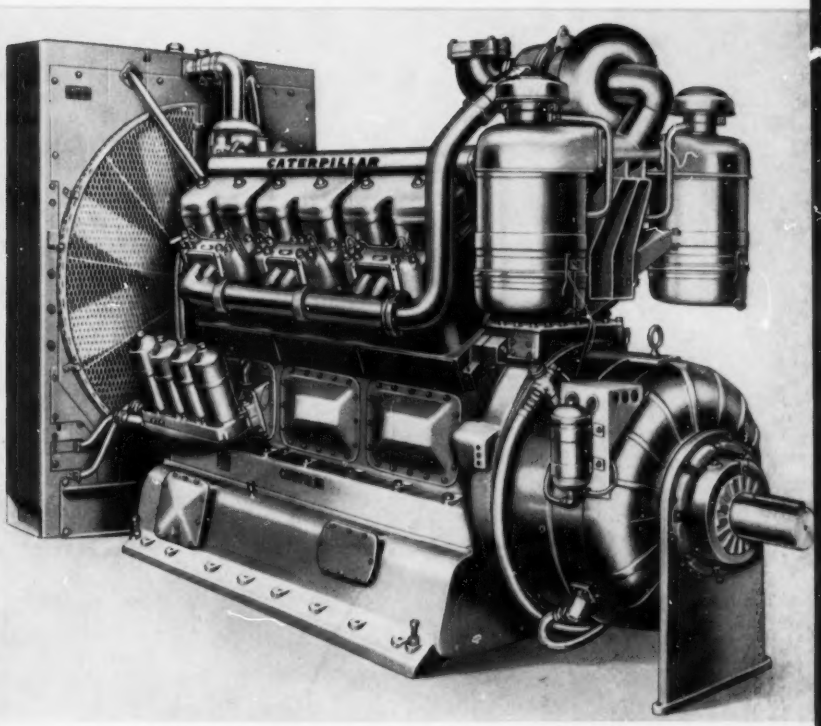
Main bearings are steel-backed aluminum alloy for better load capacity and better corrosion resistance.



Turbocharging the D397 gives higher horsepower per pound of engine weight, with operating economy and long life.



Large capacity elements filter *all* the oil, give longer engine life. The elements are accessible, and easily replaced.



The dependable Cat D397 Engine for excavators—deservedly popular in construction and strip mining—has been proved, improved and perfected. For original power and repowering, this diesel is the leader in the field because it features a "full power" fuel system, fast governor response for sudden load changes and it's built for long working life.

A dragline is only as productive as the power plant driving it. The Cat D397 (Series D) Engine is preferred "big diesel" power because through the years it has been constantly improved. This D397 (Series D) is mass-produced at Caterpillar's new Mossville, Illinois plant. This gives you higher engine quality for less money.

It means volume production of parts, too, with the same high-quality, low-cost result. Parts prices should always be reckoned in terms of the original investment. With purchase of a Cat Diesel Engine comes assurance of the best service and operating help and installation counsel in the industry. In Beckwith's territory alone, we have over 200 experienced servicemen and over 40 field service trucks on call 24 hours a day.

From 1950 to the present, Cat "V" Engines have powered the majority of big diesel excavators. Caterpillar policy of continual design improvement has resulted in over 100 major improvements in the D397 since that date. Repowering with Cat Diesels steps up production, for these power plants are free from delicate adjustments, they operate smoothly under a wide variety of loads . . . they are simple to service and easy to operate . . . they are easily started in any weather, and their dependability keeps equipment working.

So for money-saving repowering service, give Beckwith a call. One of our Caterpillar Engine Specialists will be happy to consult with you on the D397 or other dependable Cat engines to meet your repowering needs.

*Both CATERPILLAR and CAT are registered trade marks of Caterpillar Tractor Co.

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Austin AP-10 end mill type (top) and AP-10D plug type cutter bits.

Austin Cutter Bits reduce mining costs

New AP-10 end mill and AP-10D plug type cutter bits are precision manufactured by Austin Powder to penetrate faster . . . last longer . . . reduce mining costs.

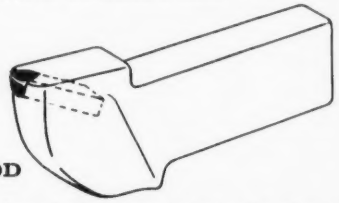
Carbide inserts are brazed in special alloy steel shanks to assure strongest possible support. As a result, tool failure, due to tip loss, is virtually eliminated even under most severe cutting conditions. This assures more production time, less time lost in bit changes.

Your Austin representative will gladly show you how these and other features of AP bits can improve your operations. Call him today! AA-8926

Maximum carbide support slashes tip loss

AP-10

Three sides and extreme end of carbide insert in Austin end mill type bit are brazed to shank.



AP-10D

Entire surface of carbide insert in Austin plug type bit with exception of cutting edge is brazed to shank.

USED IN 1833 AUSTIN & EVER SINCE

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

Bellaire, O. Brookville, Pa. Chapmanville, W. Va. Charleston, W. Va. Coaldale, W. Va. Evansville, Ind. Grundy, Va.
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